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Food Manufacture

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Vol. I., No. 4

The editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings whenever possible.

August, 1927

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Bakers' and Confectioners' Exhibition.

ON SEPTEMBER 3rd will begin the annual pilgrimage from all parts of the country to the Royal Agricultural Hall at Islington. That the management of the International Bakers' and Confectioners' Exhibition and Market are putting forward every effort to make it as attractive and useful as possible is evident from the fact that they invite the trade, both wholesale and retail, of this or any country to send any suggestions by which the Exhibition can be made of more value, educationally or internationally, to Mr. Rogers, 11, Queen Victoria Street, London, E.C.4.

Trade exhibitions have become an important feature of modern business life. Their influence is difficult to assess in definite terms, but it may be stated with confidence that, considered in relation to the few days set apart for the purpose, they wield an influence that is more powerful and widespread than any of the multitudinous factors which enter into the make-up of commerce and industry. How can it be otherwise? Gathered together under one roof are the latest improvements in machinery and utensils, together with raw materials and products that represent the highest achievements of manufacture. Here, also, are opportunities for comparison; competition and friendly rivalry are stimulated, and this makes for effort and progress. Further, there is that unique opportunity for what the Americans aptly term "making contact"; friends are made, difficulties discussed, comparisons made, and views exchanged in a holiday atmosphere of good fellowship.

Food Manufacture.

The Bakers' and Confectioners' Exhibition will be commemorated by a special Exhibition Number of FOOD MANUFACTURE. The issue will contain a series of important original articles dealing with the baking and confectionery industries. It will also contain a coloured chart, prepared by Dr. Kent-Jones, illustrating recent discoveries in flour treatment.

Those visiting the Exhibition should make a special point of becoming personally acquainted with the Publishers and the Editor of FOOD MANUFACTURE. The journal will give a full account of the Exhibition, and copies can be obtained from the Publishers' stand.

Wanted.

There has been an extraordinary demand for the May and June issues of FOOD MANUFACTURE. The Publishers would be glad to receive copies of these two numbers in exchange for the August and (or) September issues, or an addition of two months to the subscription.

Other Exhibitions.

The Second Exhibition of Foodstuffs and Cookery will be held in Paris from October 6-17 at the Magic City. Firms interested in the sale of whisky, preserves, biscuits, pickles, etc., can obtain further par-

ticulars of this exhibition on application to the Department of Overseas Trade (Exhibitions and Fairs Division) or the organisers, 24, Rue Caumartin, Paris (IXc).

An International Exhibition for the Packing of Milk and Dairy Products is to be held at Berlin from August 16-19. United Kingdom firms who may be interested should apply for further particulars to "Verein der Molkereifachleute fur die Provinz Brandenburg," 8, Chausseestrasse, Berlin, N.4.

The National Canners Convention will be held at the new Stevens Hotel, Chicago, during the week beginning January 23, 1928.

We are informed that the International Congress and Exhibition of Refrigeration at Rome has been postponed to April, 1928. In this connection it is interesting to note that the British Cold Storage and Ice Association, which was founded in 1900 and is the oldest national institution of its kind, has recently changed its name to "The British Association of Refrigeration."

American Refrigeration.

The Sixteenth Annual Convention of the American Association of Ice and Refrigeration was held in Washington on May 5-6. It is curious to note that this organisation also has decided to change its name to "The American Institute of Refrigeration" in order to eliminate any confusion with existing associations and to enlarge the scope of its activities. A number of papers were presented, and are reported in full in the June issue of *Ice and Refrigeration*.

Dr. Kohman read a paper on the "Cold Storage of Canned Fruits," in the course of which he stated that when the tomato was first introduced it was considered too common for first-class people in England to use; only the lower-class people dared use them. Now, in recent years, epidemics of scurvy have been traced to a shortage of the tomato crop. When bananas were introduced into England, the first shipment was thrown in the sewers because they could not even be given away in the slums. When the popular song in regard to the banana was heard on every side, an Englishman arriving in New York remarked: "Why make such a blooming fuss about the things?" The distribution of foods has a great deal to do with the kinds of foods we eat and with our food habits.

Canned Fruits.

Dr. Kohman then proceeded to point out some results of the effect of distribution methods in canned fruits; in particular the disastrous results of relatively high temperatures. Rise of temperature is accompanied by an increase in the rate of corrosion. Tests were carried out on 1924 packs of blackberries, strawberries, loganberries, etc., divided into four lots in each instance, and stored at 97°, 70°, 50°, and 32° respectively. They were packed about June, 1924. In November the losses began quite markedly at 97°, and at 70°; at 50° they gradually fall off, and at 32° were very much lower. With strawberries and loganberries there were no losses after storing for two and a half years at 32°.

Frozen Fish.

Dr. G. F. Taylor gave an interesting account of the rapid freezing methods of preserving fish. In contradistinction to the general method of distributing fish, it seemed more in keeping with modern times to package the fish so that it could be handled without contact with the human hand, dust, or any other contamination, and reach the consumer in as fresh a condition as when landed at the port. This can only be done by actual freezing. Thus high speed freezing was the first step. The second was the preparation of the fish ready for cooking; free from skin and bones, and put up in decorated packages. The fillets, briefly stated, are cut, cleaned, frozen in contact with metallic aluminium in 30 to 60 minutes, wrapped by automatic machinery in parchment paper, packed in insulated containers, and shipped in carload lots.

Dr. Taylor concluded his address by referring to the subject of carbon-dioxide ice in the fish industry. The high price was a serious obstacle to its general use. He also gave an account of a new temperature regulator for brine tanks.

Electrical Pasteurisation.

A new development in pasteurisation is marked by the installation of a specially designed plant for electrically pasteurising milk (the "Electropure Process") at one of the largest dairy and ice cream concerns in the Pittsburg area. The process is very simple and reliable, and occupies relatively little space. The heating cost is slightly higher than with the usual type of steam plant, but a more than compensating saving is effected in labour and other costs. The pasteuriser unit proper consists of two carbon electrodes spaced 3 inches apart by hard rubber blocks forming a chamber through which the milk passes upwards. The electrodes are cooled. Single-phase alternating current of 230 volts is used. The milk takes about 12 seconds to pass through the heating chamber. The cream line remains unchanged, and as there is no change in the physical properties of the milk, the taste is not affected as in steam pas-

teurisation. A unit rated at 50 kilowatts has an hourly output of 600 gallons of milk. The plant indicated above has three electrodes and gives an output of 1,800 gallons per hour.

Formaldehyde in Smoked Foodstuffs.

The July issue of *The Analyst* contains an article on "The Presence of Formaldehyde in Wood Smoke and in Smoked Foodstuffs," by Dr. E. H. Callow, which should prove of considerable interest to bacon and fish curers. It is stated that a large firm of bacon curers recently raised the question as to what are the preservative agents introduced by "smoking," by drawing the attention of the Food Investigation Board to the fact that smoked bacon and ham gave a strong reaction for formaldehyde when tested by Schryver's method. As unsmoked bacon or ham only gave a faint or negative reaction, the smoke itself was naturally suspected as the source of the formaldehyde.

As a result of carefully arranged laboratory tests, strong reactions for formaldehyde were found to be given by smoke from sawdust derived from oak and deal and from sawdust supplied by a bacon-smoking firm. The Schryver method was employed after experiments by Dr. Callow had shown it to be specific. Moreover, a confirmatory test gave the same result. Thus it may be safely concluded that wood smoke contains formaldehyde.

An experiment was then carried out to show that wood smoke can cause bacon to become impregnated with formaldehyde. Samples of various foodstuffs—herrings, bloaters, kippers, smoked bacon, smoked ham—purchased from local shops likewise gave positive reactions.

Vitamin Studies.

In the course of a report by the secretary, Mr. Frank Gorrell, to the National Canners Association on the occasion of a directors' meeting at Washington on May 26, it was stated that during the past winter feeding experiments were made with tomato products, including canned whole tomatoes, tomato pulp concentrated under vacuum, cyclone juice from which these were made, and clear filtered juice made from this cyclone juice. All of these products were canned so that they would be available for feeding during the winter. Any effect on the vitamins, therefore, was the combined effect of the concentration and the canning.

Very little of vitamins A and B was lost in any of the products except clear filtered juice, from which the filtering apparently removed a large portion of the vitamin A. There was more or less loss in vitamin C in all of the products, the greatest loss occurring in the cyclone juice and the least in the canned whole tomatoes.

The high vitamin loss in canning the cyclone juice was probably due largely to the air that was churned into the juice by the cyclone. In concentrating both in an open kettle and under vacuum, this air would be removed rather promptly, and consequently would not have the destructive effect that it did have in the case of the cyclone juice. Filtering the juice removed the air because the air was largely held by the suspended material.

The reason that the loss under vacuum was greater than in an open kettle was probably the fact that concentration of any one batch takes much longer under vacuum by the method used than concentration in an open kettle.

At present the Laboratory is studying the vitamin content of canned strawberries, and preliminary results indicate that they will be considerably higher in vitamins than one would be led to suspect from the meagre data that can be found in the literature.

Enterprise.

The Association's Secretary also gave an account of his observations on canned foods gleaned in the course of a visit to Europe. These observations should prove valuable to American canners concerned with the export trade; they are likewise interesting and instructive to others. One cannot but admire the Association's enterprise in sending a representative on a two months' exploration of foreign market and industrial conditions. One conclusion reached was expressed thus: "It is only fair to say that the canning industry in the United States is strides and strides ahead of any other country on research. As I became acquainted with the scientific men, this was made more and more apparent to me."

Secretary Gorrell learnt that the Italian tomato industry is in a critical condition. It has been suffering from "over-production," and from a loss in the local market for tomato paste, owing to the poor quality of tomato paste thrown on the home markets during the past two years. According to Dr. Scarpitti of the Canned Goods Institute this has resulted in a permanent alienation of the public taste for this product. Dr. Scarpitti feels that peeled tomatoes will take the place of tomato paste and that the change is permanent; this change will be reflected in production, except in the case of certain well-known brands which have continued to maintain their high standard, and will be sold on a quality basis.

The Italian canners have an association, membership of which is obligatory. Its management is largely in the hands of the canners themselves. They have adopted an inspection system. The association can order the arrest of its members for disobeying rules and regulations. Labour is cheap, and there is consequently little inducement for canners to buy modern machinery, although some is being installed in the larger plants.

Canned foods in France are distinctly in the luxury class; the French canners cater especially for the best hotels and restaurants. There is room for proper education and the right prices amongst other sections of the community. The Minister of Agriculture, M. Eugene Roux, was especially interested in the packing of soaked peas, as the French food officials are vigilant in preventing this practice. Through their laboratory they have worked out a method of examination which makes prosecution possible. Dr. R. Fillon showed the Secretary an experimental pack of canned sardines which he had put up over two years ago, which was completed without sterilisation. The Pasteur Institute has for the past thirty or thirty-five years been conducting research on problems closely akin to the canning industry. Owing to restricted financial conditions these researches have not been published; Mr. Gorrell made a grant of $1,000 to the Institute for the purpose of assembling that data.

The Secretary then proceeded to state that Germany will offer an excellent market for canned goods when tariffs have been properly adjusted. Germany is recovering very quickly from the effects of the war. The people have gone to work, regardless of sex, and they look prosperous. The country has reduced its taxes.

Canning in Germany is an industry of some consequence. The canning of peas is expanding, especially in the Harz region, where some American pea-canning machinery has recently been sold. The Secretary was impressed with the campaign now being conducted for the purpose of inducing the people to eat German canned goods. He also states that German consumers are particularly anxious to purchase American goods of various descriptions, because they believe they have a superior value; this is put down to American salesmanship. Manufacturers anxious for this business have brought American sales managers into the country, and the German sales managers are trained in the American methods of selling goods.

There is a great interest in Germany in canned fish, especially salmon. A desire was expressed to know more about this product, and there is an opportunity, therefore, for a liberal education which will greatly increase consumption. Mr. Gorrell was requested to see that suitable literature was furnished for this purpose.

Certain German importers of canned fruits have the cans opened prior to their arrival at the frontier, which permits the shipments to enter under the lower tariff schedule as fruit pulp, the duty on which is from 5 to 10 marks per 100 kilograms as against an average of about 60 marks per 100 kilograms if the shipments are entered in their original condition. The fruits are then shipped to a dealer who re-cans them in other containers. The quality of the original product is very much impaired.

England has always been a large market for canned foods. Originally it re-exported considerable quantities of canned foods under the labels of well-known English distributors. This practice, however, seems to have largely passed, and the reason given was that canners of the United States are now seeking direct representation in the different countries, instead of letting their goods pass through English distributors.

In the course of a discussion with one of our officials, Mr. Gorrell stated that the Bureau of Chemistry was about to conclude a research which would establish the fact that tin salts from canned foods, being practically insoluble, are in no way harmful to the human system.

Representatives of the trade who are large handlers of American canned foods did not have any conception of the care and thoroughness with which the members of the National Canners Association are protecting their products through ample research. They expressed an opinion that if British consumers were acquainted with this research, the consumption of American canned foods would be greatly increased.

Unfounded Prejudice.

Dr. C. R. Fellows has recently drawn attention to the deep-seated prejudice that even now exists against canned foods, especially in the minds of older people and in certain sections of the country. Thousands of cases of illness have been wrongfully attributed to them. They have been merely a convenient peg upon which the unknown cause of an illness could be hung. It is probable that canned foods are among the safest that are consumed.

The old "ptomaine" theory of food poisoning has been relegated to the past as modern researches have demonstrated that most decomposition products are relatively harmless, and that nearly all acute gastro-intestinal disorders are due to specific bacteria. After all, the total number of deaths from botulism is insignificant when compared with even rare or extraordinary causes of death.

As to the supposed dangers of dissolved tin and iron in canned foods, we have no reliable data to substantiate such claims. Tin plate used for can manufacture is lead-free. Lead solder is never used in contact with the food. Even where corrosion is marked it is probable that as long as the contents are palatable, there need be no fear of metallic poisoning.

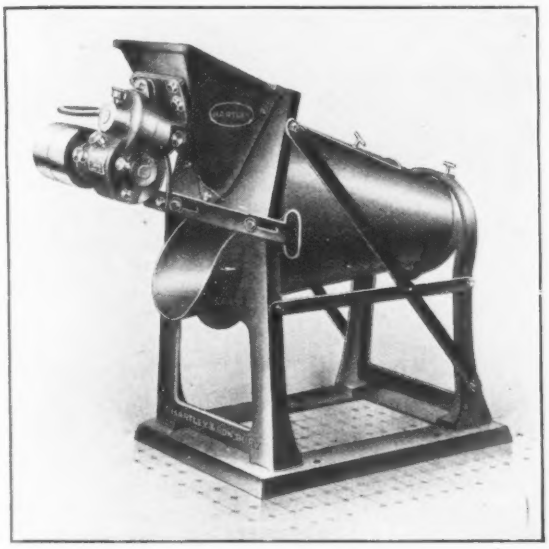
Struvite crystals (magnesium ammonium phosphate) have been found rather commonly in canned shrimp, crab, and salmon. In a number of instances these hard gritty masses have been mistaken for glass. The substance is entirely harmless and appears to be a natural constituent of some canned foods.

Jam Manufacture

By HERBERT MANSFIELD, B.Sc., F.I.C., F.C.S.,
Director of Messrs. Lavell and Co., Ltd.,
Late Factory Manager for Messrs. John Moir and Son, Ltd.

PART II

The first article of this series on the manufacture of jams, which appeared in our May issue, discussed the factors to be taken into consideration in deciding between the direct process of converting the fruit directly into jam and the indirect process of preserving the fruit for jam-making at a subsequent date. In this connection particulars were given of preserving fruit by chemicals, pulping by heat, parboiling, and refrigeration. The article below takes up the more practical considerations of jam-making proper.



Pulping Machine.

THREE CONSTITUENTS are necessary in making a fruit jelly—namely: (1) Pectin, (2) Acid, (3) Sugar, and in order to secure the best results the jam boiler should employ the correct proportions of each. Fortunately, there is an adequate quantity of pectin in most fruits, especially before they are ripe. Strawberries, however, are an exception, and sometimes raspberries have barely enough. It is advisable, in these two cases, to increase the natural pectin content by the addition either of a commercial product known by this name, an article which is made from apples and usually contains between 4 per cent. and 6 per cent. pectin, or, alternately by the addition of gooseberry juice which contains up to 1·5 per cent. pectin. In commercial jam manufacture, however, it must be borne in mind that the apple product can be detected by the analyst in the finished jam, although he will find it very difficult to estimate the quantity; whereas gooseberry juice, if used in moderation, cannot be detected.

Moreover, the acid of gooseberry juice is useful in that it assists the feeble acidity of the strawberries in converting the added cane sugar into invert sugar, a necessary process, since it is found that cane sugar as such cannot produce a jelly. Only after inversion can the pectin combine with it to form a jam. If, therefore, no acid is added, it will generally be necessary to boil jams made with these fruits considerably higher, with consequent loss of yield.

The total percentage of sugar in finished jam should be as near 67 per cent. as possible, of which about 40 per cent. should be inverted. If more sugar than this is present, the resultant jam will lack springiness, and, after standing, may crystallise. Moreover, the cost is increased by sugar taking the place of what should have been water.

On the other hand, if the percentage of sugar be lower, mould will rapidly develop on the surface, and actual fermentation may take place in the preserve.

In practice, the percentage of sugar is ascertained either by:

1. Observing the boiling-point of the jam. As the water boils off, the boiling-point of the jam rises, and this rise is watched on a thermometer such as the one illustrated, which is a recently improved instrument specially designed for this class of work.

2. By observing the refractive index of the jam on a refractometer. The percentage of sugary matter can be immediately ascertained by using the table supplied with the instrument.

In addition to these methods of watching the progress of the boil, it is desirable to ascertain if the necessary amount of pectin is present, and, as it would take too long to make a chemical analysis, the foreman usually tests a batch of pulp or fruit by personally conducting an experimental boil, using a spaddle having a thin edge and observing if, after slight cooling, the preserve falls from its edge in a sheet. He also finds out whether it sets in a satisfactory manner on a cold plate. When finally this is the case, he observes and notes the boiling point of the finished product, and when cool, takes a reading

Refractometer.

on the refractometer. If the experimental boil is satisfactory in all these respects, he instructs his jam boilers to continue boiling the jam up to the boiling-point of his experimental batch.

Preparation of Fruit or Pulp

Strawberries, being hand-picked, can usually be placed directly in the jam pans, and, indeed, this must be done if the texture of the whole fruit is to be preserved.

Most other fruits have to be cleansed of leaves, stalks, etc., this being done by first pulping till soft and then passing the hot pulp through a screening machine such as the one illustrated. This process, in addition to removing these undesirable impurities, removes all the stones, in itself a useful thing, as only about one-third of the stones present in the natural fruit are used in the finished jam.

Raspberries are put through the pulper without boiling in order to remove the hard pithy cores and any leaves, etc., which may be present.

Boiling

This is done in a steam-heated, copper-jacketed pan, usually having a capacity of about forty gallons. Such a pan is large enough to boil 1 cwt. of jam, but ample room should always be allowed for the sugary contents to froth up without boiling over. A suitable pan such as the author recommends is illustrated on the opposite page.

The sugar and fruit are introduced and the steam is turned on. The mixture is stirred with a wooden spaddle till the sugar is partly dissolved, when the boil can be left till it nears completion. This point can be ascertained, as above indicated, if the foreman (or chemist) has done an experimental boil, by watching the thermometer, which will indicate the gradual rise of temperature to the desired point. An experienced boiler will occasionally test the setting power of his jam by means of the spaddle, making sure that the preserve leaves the edge of his spaddle in the form of a sheet.

As soon as the jam is finished, the steam must be turned off and the jacket of the pan emptied. The jam should be immediately poured out of the pan and transferred to a cooler, which is usually a shallow water jacketed tank, such as illustrated, although there are on the market several more or less complicated systems of cooling.

Careful cooling is especially necessary in the case of whole strawberry or stone fruit jams, where there is a tendency for the fruit to rise if the preserve is not sufficiently set before it is poured into the jars. If, on the other hand, cooling has been carried too far, air bubbles will be imprisoned and the appearance of the jam will be spoilt.

Fillinig

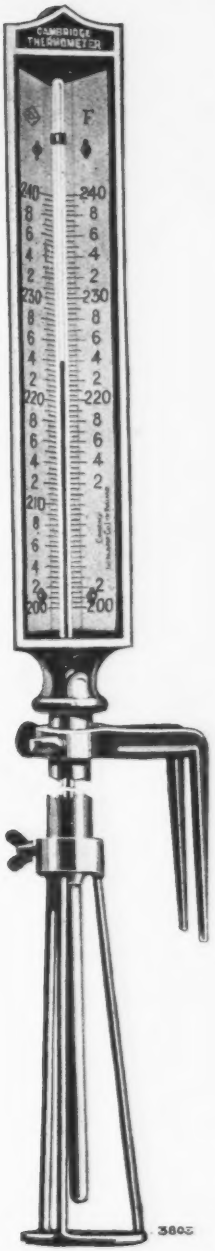
There are several jam filling machines advertised, each of which is claimed to give good working results. In principle, they are based on delivering either a definite volume or a definite weight of the jam. In the former case, two difficulties arise. Firstly, jams differ appreciably in specific gravity, and, therefore, a given volume of one jam will weigh appreciably more than the same volume of another; and secondly, if glass or earthenware jars are to be filled and a constant volume is poured into them, then, owing to variations in the height, the top of the preserve will vary so much that some jars will appear only partly filled, whereas in others the jam will flow over the top.

In the case of the constant weight machines, the first of these objections is overcome, and for filling tins they are quite useful, but the varying size of the glass containers remains a real difficulty.

Moreover, in using either kind of filling machine, in practice it will be found that when it is desired to change from one kind of jam to another (unfortunately an all too frequent occurrence, especially with the small manufacturer) a very considerable time is taken in cleansing the machine, a process which, in some types, necessitates the presence of an engineer, and also that in the washing process an appreciable amount of jam is wasted.

A final objection is that there is a very great

Steampan



Thermometer, specially designed for Jam Boiling.

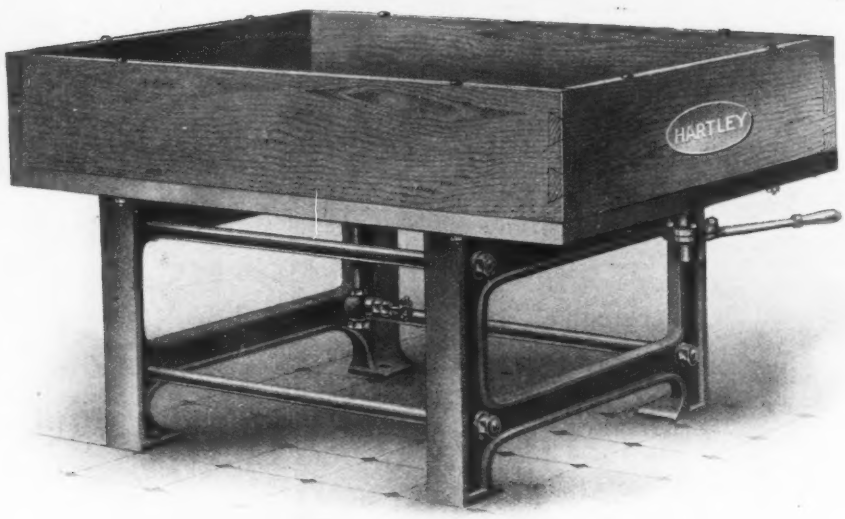
possibility of choking up the machine if a stone fruit or a whole fruit jam is being filled.

It has been the author's experience that these filling machines are only suitable for use when it is possible to run all day on a particular preserve, say, marmalade, and then only when it is to be filled into cans.

For general use, hand-filling seems still to be the most expeditious and satisfactory. This can be done by means of small jugs mounted on handles, the preserve being ladled direct from the cooling tank into the jar.

A convenient arrangement is to have one girl placing the jars into grooves on to the edge of a movable table, which has a top capable of rotating. Another girl fills a jar with one hand and pushes the table top round with the other. A third girl taking off the full jars and placing them on to a conveyor which removes the jars to a cooling room, where the jam sets.

The jars are next inspected, and, where necessary, washed, and then covered with tissue, labelled by machine, and finally the tops "finished off."



Cooling Tank.

(*Continued from page 94.*)

Sample.	*Water.*	*Salt.*	*Fat.*
	Per cent.	Per cent.	Per cent.
Fresh Herring, ungutted	67·33	0·63	13·78
Herring, lightly salted, before gutting	66·33	1·27	12·11
Herring from rousing tub, gutted and salted, ready to pack into barrel	61·09	1·41	16·14
Herring, after 7 days salted in barrel	52·67	7·43	17·10
Herring, after 8 days salted in barrel	46·90	11·49	22·50

At the end of eight days a hole is drilled in the barrel at the bilge and the pickle is allowed to run out. Owing to the withdrawal of moisture, the herrings are found to have shrunk considerably, and more salted herrings are added to the barrel to fill it. The barrel is then headed, filled with brine pickle through the hole in the bilge, which is then corked up, and is ready for despatch. When herrings are salted for export, about thirty per cent. more salt is used.

Rusting and Reddening

Occasionally, owing to the loss of brine pickle from a leaky barrel, a portion of the contents becomes uncovered. Upon the fish that become exposed rusty brown patches quickly develop, particularly in warm weather. These patches are due to the active growth of a peculiar kind of salt-loving microbe which thrives on substances such as meat, fish, or animal hides when they are impregnated with salt. The rusty brown deposit that is formed on herrings is peculiar, and is attributable to the oily character of the medium. When these micro-organisms develop on the comparatively oil-free flesh of a salted cod or animal hide, they produce small yellow or pink spots. Since these microbes need oxygen, they only grow upon surfaces that are exposed to the air; consequently, rusty herrings only occur in barrels from which brine has leaked on standing. They are not found in barrels which have been kept filled with brine.

There is no direct evidence to show that salted fish which has become brown or red in this way are unfit for food. At the same time, they develop a sour odour and are very much less attractive to the consumer. A considerable proportion of the output of salted codfish is rejected every year owing to this reddening.

The particular strains of bacteria which cause the "rusting" of herrings and the "reddening" of cod have been found to occur in sea water all over the world. They flourish in the evaporating ponds of solar salt works, in which sea water is evaporated by the direct heat of the sun. Consequently, the salt that is made in such places becomes heavily infected with them. These micro-organisms will be found in a latent condition in most samples of sea salt, ready to resume active growth when suitable conditions are provided—for example, upon the surface of a salted fish in warm weather. English salt, made by the evaporation of brine drawn from vast underground deposits in Cheshire and Worcestershire, is found to be entirely free from these micro-organisms. Considerable quantities of the relatively cheaper sea salt from Spain and Italy are, nevertheless, used by fish curers in this country.

(*To be continued.*)

The Herring Industry

By W. E. GIBBS, D.Sc.,
Chief Chemist, The Salt Union, Ltd.

PART II.—SALTING

The first article of this series dealing with the herring industry outlined the fishing methods employed to-day, and discussed the differences in appearance, quality, and food value of the fish according to differences in species, feeding ground, and season at which it is caught. The present article describes the process of gutting and salting, and also deals with two other important matters—the influence of the quality of the salt used and the causes of the development of the "rusting" of herrings and the "reddening" of cod. The next article will give an account of the preparation of red herrings, bloaters, and kippers.

Gutting Herrings.

WHEN THE herrings have been unloaded on the quay-side the catch is auctioned and is then delivered to the purchaser's curing yard. Here the fish are cured with brine or salt. If the herring is to develop into a red herring, a bloater, or a kipper, it is also smoked. The degree of salting and of smoking depends upon the particular kind of product that is desired. Salting may be light (for bloaters and kippers) or heavy (for salted herrings and red herrings). Similarly, smoking may be simply overnight—in the case of kippers—or may extend over ten days for red herrings.

Gutting

A broad, shallow trough, called the gutting trough, arranged at a convenient working height, runs from end to end of the curing yard. The fresh herrings are delivered into this trough and are liberally sprinkled with salt. The finer particles of the salt adhere to the slippery surface of the fish and enable them to be handled more readily.

The fish are gutted and salted by Scottish women, who travel each year to the different fishing ports for the purpose. Through long practice, these women acquire astonishing skill and speed. They work standing in a row beside the gutting trough. A woman picks up a fish, guts it by inserting a sharp knife just below and behind the gills, and, with a quick, upward cut, brings away the gut. The guts are dropped into small tubs, and are collected from time to time and sold to manufacturers of manure.

Curing Yard at Yarmouth.

Each fish, after being gutted, is thrown, according to its size and quality, into one of three tubs which stand behind each woman. In this way the operations of gutting and selecting the fish are combined.

Salting: Stage I

As the tubs become filled with the gutted fish they are taken away to the barrel packers, who also work in long rows running parallel with the gutting trough. Fish from the different tubs are packed in separate barrels, according to quality or size.

The gutted fish are first thrown into shallow tubs, known as "rousing" tubs, in which they are stirred up with more dry salt. In this way salt is introduced into the newly exposed body cavity, and the fish become thickly coated with it. The packer takes an armful of fish from the rousing tub and drops them into a barrel. The fish are packed in the barrel in layers, bellies upward, and each layer is liberally springled with salt. In this way each fish becomes coated internally as well as externally with salt, while the adjacent layers of fish are separated from each other by a layer of salt.

Quality of Salt

The success of the cure depends primarily upon the use of sufficient salt as well as upon the quality of the salt that is used. When the dry salt comes into contact with the fish it extracts moisture from it, to form a saturated brine or pickle containing also a certain amount of blood and protein from the fish juices. If too fine a salt is used it would dissolve too quickly, so that adjacent fish might come into contact with one another before they were cured, and become spoiled at such points of contact. With larger fish—for example, cod and haddock—the relatively rapid curing that is obtained when fine salt is used tends to cause coagulation of the layers of the surface flesh, so that further penetration is checked and the interior of the fish becomes spoilt. It is necessary, therefore that for successful curing the salt should be sufficiently coarse to prevent the fish from touching each other throughout the curing process, and so enable the brine to penetrate to every part. The salt should dissolve slowly, so that the salting process takes place gradually, and it should be hard enough to resist the pressure of the fish in the barrel. There should be a sufficient excess of salt present at the beginning of the process to keep the brine pickle saturated throughout. About 1 cwt. of salt is used to each barrel of herrings cured. Each barrel contains approximately one cran of herrings—about a thousand fish—weighing approximately 3 cwt.

Salting: Stage II

When fully packed, the barrel is covered over and left for about eight days, during which time moisture continues to be extracted from the fish and becomes partially replaced by saturated brine. The gradual change in the composition of the flesh is shown by the following analysis:

(*Continued on page 92.*)

Baby Foods

By E. H. CALLOW, B.Sc., Ph.D., A.I.C.

The question of baby foods is an international one. At the moment few countries have legal standards. There is little doubt that many inferior products are sold by the auto-suggestive power of advertisements. No baby food ought to be sold unless accompanied by a statement of its contents. This statement should contain analytical data showing the percentage composition (water, carbohydrate, fat, protein, salts, etc.), together with a declaration as to the origin of the various constituents. Such a reform would be in the interests not only of the public, but also of those firms which supply the best types of baby food. Inadequate baby foods have been one of the principal factors responsible for infantile ill-health in the past.

NO ONE will dispute for one moment the contention that the only ideal baby food is the mother's milk. Unfortunately for the race, many mothers are not able to feed their children, and other diets have had to be discovered. The most obvious substitute is the milk from domesticated animals. In the past the milk from cows, sheep, goats, mares, and asses has been used for feeding babies, and if there is any truth in travellers' tales, even such animals as wolves and monkeys have acted as foster-mothers to the offspring of *homo sapiens*. At the present time, however, the cow is the only milk-supplying animal of commercial importance in Great Britain. Unfortunately cow's milk cannot be stored for long periods, and some babies cannot readily digest it; consequently there is a demand for other forms of baby food, and a vast number of artificial foods are now on the market.

The Ideal Baby Food

The ideal artificial baby food would, of course, be one which exactly resembled human milk. In our present state of knowledge, this ideal is impracticable. The reasons for this state of affairs become apparent when the complexity of the composition of human milk is considered. A normal mother's milk (about the second week of nursing) contains about 88 per cent. of water and 12 per cent. of solids, which consist of protein, fat, carbohydrate, salts, and various substances of unknown composition. There are two kinds of protein present, lactalbumin and casein, and the fat fraction contains important substances such as lecithin. The mineral matter is also extraordinarily important, and contains, among other substances, calcium phosphate (attached to the casein) and iron in an unknown form. The carbohydrate of human milk is lactose or milk-sugar. All the water that the normal baby requires is contained in the milk. The chief function of the protein is tissue formation, whereas that of the fat fraction and the milk-sugar is to meet the energy requirements. A supply of calcium phosphate is necessary for bone formation and the development of teeth. The exact state of combination in which all these substances exist in human milk is not yet known, and there are probably other substances of great importance present in such small amounts that they have so far eluded chemical analysis. We already know of one such group of substances—the vitamins. The supply of vitamins in human milk is adequate if the nursing mother herself has a diet containing these accessory factors. Since much more knowledge is required before the composition of human milk can be definitely stated, it is advisable to be extremely cautious when discussing substitutes.

A Comparison of Various Milks

The average composition of the milk from domesticated animals differs considerably from that of man. When the function of milk is understood this is not at all surprising. Milk provides food for the young, *growing* animal, and different species of animals grow at different rates. There is a correlation between the rate of growth and the two principal growth-promoting substances (proteins and salts) present in milk (see table). It will be noticed that the more rapidly an animal grows the more proteins and salts there are in its food. Besides these quantitative differences there are other important facts which must be mentioned. Cow's milk contains about the same amount of lactalbumin as human milk, but the quantity of casein present in the former is about two and a half times more than in human milk. It is due to this, and to other differences in the two milks, that cow's milk is not so readily digested by babies as is mother's milk. The clotting of cow's milk in the baby's stomach leads to the formation of a denser type of curd which is not so readily penetrated by the digestive juices.

Type of Milk.	*Approx. No. of days required for animal to double its weight.*	*Water.*	*Sugar.*	*Fat.*	*Protein.*	*Ash.*
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Goat's	19	87·55	3·8	3·4	4·3	0·95
Cow's	47	87·4	5·0	3·9	3·0	0·70
Mare's	60	90·3	6·35	1·0	1·9	0·45
Human	180	88·3	6·5	3·5	1·5	0·20

Humanised Milk

In order to produce a fluid resembling human milk in its crude chemical composition, cow's milk may be modified. There are many ways of doing this, the main principle of them all being dilution until the protein content of the two milks is the same. The milk can be diluted with water, barley water, lime water, or whey. When the first three fluids are used, the diluted milk is deficient in fat, lactose, and lactalbumin. It is usual, therefore, to add cream and lactose in order to adjust the content of fat and carbohydrate to the human standard. The deficiency of lactalbumin is usually overlooked. When whey has been used as a diluent, however, only cream need be added, as whey contains both lactose and lactalbumin. Modified milks made by these and other methods have a limited sale, and are prepared by a few dairy companies in this country. Such modified milks are usually known as humanised milks, and are very difficult to obtain in most parts of the country. Few people have the knowledge or leisure necessary to prepare modified milk in the home, and the result is that they use dried preparations which are much easier to manipulate.

Dried Milk Preparations

There are innumerable preparations which have for their basis desiccated milk. Preparations made from whole milk, when mixed with sufficient water, give a fluid with practically the same composition as cow's milk. They have the great advantage of being free from the harmful bacteria which infest summer milk unless special precautions are taken. Obviously, if ordinary milk requires modification, these dried preparations will also require it. Some firms prepare dried milk that has already been modified, so that it approximates to the composition of dried human milk. In other cases sugar is added. Some authorities consider that cane sugar has an irritating effect on the digestive tract of the infant. When a sugar is added it is preferable to use lactose, as we know that this sugar is easily digested by babies. Even the best of desiccated milks suffer from a very serious defect, since the present methods used in desiccation destroy most of the vitamins of the original milk. In some preparations fat is deficient. Before using this type of food the content of fat should be ascertained and due allowance made by adding cream if necessary. It may be assumed that vitamins are deficient, and extra vitamin-containing substances—*e.g.*, cod-liver oil, fruit juices, etc.—should be added to the baby's diet. With these precautions, it is possible to rear a baby successfully on this type of artificial food.

Peptonised Foods

We have seen that cow's milk cannot be readily digested because the casein forms a dense clot in the infant's stomach. One group of proprietary foods attempts to remedy this defect by peptonisation of the protein. This may be accomplished by peptonising cow's milk and desiccating the resultant fluid. Another method is to produce a powder containing various ingredients, including a proteolytic enzyme. The powder is mixed with milk, which is warmed to blood heat in order to peptonise the protein before using the milk. Complete peptonisation is not necessary, and, in fact, may be harmful except in certain pathological cases. Partial peptonisation of the casein from cow's milk appears to be beneficial, as it enables the baby's stomach to deal with this otherwise difficult protein. It may be mentioned that, during the desiccation or condensation of cow's milk, changes occur in the casein which apparently render it more digestible.

Condensed Milks

There are three main types of condensed milk, all of which are frequently used as baby foods. They are popular with a certain class of people because they are easy to prepare and babies take them with avidity. Milk may be concentrated to form condensed whole milk, sugar may be added before concentration (sweetened condensed whole milk), or sugar may be added to skimmed milk and the resultant fluid concentrated. The only one of these which ought to be used as a baby food is the first. With this type of condensed milk all that is necessary to obtain a fluid of the consistency and approximate composition of cow's milk is to add about two parts of water. One objection to this kind of milk is that it will not keep very well after it has been removed from the tin. A glance at the table shows that large

EXTREME VARIATIONS IN CHEMICAL COMPOSITION OF CERTAIN CLASSES OF CONDENSED MILKS.

	Full Cream.				*Machine Skimmed Sweetened.*	
	Sweetened.		*Unsweetened.*			
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Water	31·9	36·4	70·8	62·0	43·1	20·9
Fat	8·0	13·7	8·2	11·9	0·1	0·5
Protein	7·3	11·4	8·0	10·0	7·6	12·3
Ash	1·6	3·4	1·6	2·5	1·6	2·9
Lactose	11·6	17·0	11·1	16·0	10·9	17·0
Cane Sugar	36·1	44·6	Nil	Nil	30·4	52·6

quantities of cane sugar are added in making the other two types of condensed milk. Cane sugar is unsuitable for babies, as it is not a normal constituent of their food; also there is usually such a large quantity of sugar present that the condensed milk has to be greatly diluted before it becomes palatable. The degree of dilution thus necessary causes the resultant fluid to lose its resemblance to milk. In the case of the condensed, sweetened, skimmed milk the amount of fat present after dilution is extraordinarily small. All condensed milks need supplementing with vitamins. They have, however, one advantage as they are more digestible than normal cow's milk.

Carbohydrate Foods

There are many proprietary foods which, though not complete baby foods in themselves, are useful as

(*Continued on page* 98.)

The Present State of our Knowledge of Vitamins

By R. F. HUNWICKE, B.Sc. (Lond.), A.I.C.
(*Glaxo Research Laboratories*).

In view of the importance attached to the presence of vitamins in foodstuffs, we have been repeatedly asked for information upon the subject. The advance made is so rapid as to be positively bewildering, and the enormous output of literature, some abstrusely scientific and some highly coloured with obviously exaggerated statements, only serves to intensify the confusion. The request is for a simple account of the main facts as these have been so far ascertained. We feel confident that the article below will meet these requirements.

IN THIS article it is not proposed to go into details regarding the latest work on vitamins, because to do this would be impossible in the space available. The volume of published work on the subject is enormous — something like three hundred papers bearing on vitamin research are published each month in the scientific journals of the world.

No one person can possibly keep track of all this information; all that can be done is to keep abreast of the general trend of knowledge. It is thought that what is needed by readers of FOOD MANUFACTURE is a concise summary of the main facts as they appear at present, and that is the intention of the writer of this article.

I. The "Fat-Soluble" Vitamins

There are two vitamins associated with fats (the term "fat" including, of course, those oils which are fats in the chemical sense).

These vitamins are designated:

1. Vitamin A, the anti-xerophthalmic factor.
2. Vitamin D, the anti-rachitic or calcifying factor.

Until the year 1922, or thereabouts, it was thought that there was only one fat-soluble vitamin, which was called vitamin A, and which was also referred to as the "growth-promoting" factor. This vitamin was thought to be not only necessary for correct growth of an organism, but also to be the factor which gave to certain fats, and to cod-liver oil in particular, the property of preventing and curing rickets, a disease which is due to a deficiency of calcium in the bones.

Now it was known at this time (1922) that vitamin A was readily destroyed by heat accompanied by oxidation. The experiment was then tried (by Shipley and McCollum, in America) of destroying the vitamin A in cod-liver oil by blowing air through it and heating it to boiling point for a considerable period, and then feeding this oil, which had been so thoroughly oxidised, to experimental animals. It was found that although this oil failed to protect animals from xerophthalmia (an eye-disease due to deficiency of vitamin A), it nevertheless still prevented and cured rickets. Here was almost conclusive proof that there was another vitamin in cod-liver oil, a vitamin stable to heat and oxidation, and which showed as its main characteristic the ability to prevent and cure rickets. Further work fully substantiated this fact, and the new vitamin was officially designated "D" by the Medical Research Council in their report for 1925.

It is to vitamin D that cod-liver oil owes its therapeutic value of promoting the correct adsorption of calcium from the food. Cod-liver oil is the richest known source of vitamin D in nature. Good butter contains abundant vitamin A, and a proportion of vitamin D. Cod-liver oil contains abundant vitamin D (though individual samples, even of crude oil, vary in their content of this vitamin a good deal) and a proportion of vitamin A.

It has been known for a long time that rickets could be improved or cured by exposure of the skin of the patient to the direct rays of the sun or to artificial sources of ultra-violet light. At one time there were two schools of thought in the medical world with regard to rickets, one holding that the disease was purely nutritional in origin, the other holding that absence of light, as in crowded cities, was the main factor in its causation. Nowadays these two schools of thought are reconciled; it is now known that rickets is due to a deficiency of vitamin D, and that this deficiency can be made good either by increasing the amount of vitamin D in the dietary or by exposing the patient to the rays of the sun or to an artificial source of ultra-violet light. When the latter treatment is adopted, the vitamin D is actually produced in the skin of the patient by the chemical action of ultra-violet light on the cholesterol of the skin. In point of fact, sunlight is thought to be the source of the vitamin D in cod-liver oil; the vitamin is probably produced in the minute animal and vegetable forms of life which inhabit the surface layers of the sea (the "plankton" as it is termed) by the action of the sun's rays upon them. This plankton is then eaten by the small fish which, in their turn, become the food of the cod fish. The cod has the particular power of storing vitamin D in its liver, and the oil is finally expressed and used as a rich source of the vitamin for medical purposes.

Further than that, recent work has shown that the vitamin in cod-liver oil resides in the unsaponifiable fraction of the oil, less than one per cent. of the whole, and it is now possible to obtain a highly concentrated preparation of this fraction (known commercially as "ostelin") which has obvious applications in medicine.

It has been said that vitamin D is produced by the

action of ultra-violet light on the cholesterol of the skin. In the same way, if cholesterol itself, a waxy substance, is exposed to ultra-violet light, it becomes "activated," vitamin D being produced. Very recent work, chiefly that of Rosenheim and Webster, has shown that the parent substance of vitamin D is actually another sterol associated with cholesterol, and known as ergosterol. More cannot be said of this here, but this work gives promise of an elucidation of the chemical nature of the vitamin, and possibly of its eventual isolation in the pure form.

II. The "Water-Soluble" Vitamins

These include the two other well-established vitamins, B and C.

Vitamin B is the factor the absence of which causes the Eastern disease known as beri-beri. It is necessary for adequate growth and development. Its richest source is yeast extract, of which Marmite is an example. Malt extract, if carefully prepared, is also a good source of this vitamin.

Vitamin C is the anti-scorbutic factor. In its absence the deficiency disease known as scurvy develops. This disease was common in the old days of sailing ships, when fresh provisions were not available for the crews. The richest source of vitamin C is the juice of citrus fruits, such as the orange. This vitamin is very readily destroyed by heat and oxidation; it is the least stable of all the vitamins.

It may be pointed out here that heat alone causes practically no destruction of vitamin C, or of the other vitamins. It is a question of oxidation, and this is why certain processes of manufacture which were at one time assumed to be destructive of the vitamins are now known to be innocuous, provided air is excluded during the heating which the food undergoes. Domestic cooking in open vessels may, however, cause diminution in the vitamin content of foods, and that is why the consumption of a proportion of fresh fruits and vegetables is often urged by dietitians.

The four vitamins, fat soluble A and D and water soluble B and C, are now accepted, at any rate in this country and in America, as being definitely established as distinct dietetic factors.

There are, however, two other vitamins which are still, to some extent, the subject of controversy, and this article would not be complete without a reference to them.

Vitamins E and F

As long ago as 1922 Evans and Bishop announced the discovery of a new dietary factor essential for reproduction, which they termed "Substance X."

The following year Barnett Sure confirmed the existence of such a factor, which he considered to be a specific vitamin controlling reproduction and which he named "Vitamin E." This name was afterwards adopted by Evans and his co-workers, who spoke of "Vitamin E, the anti-sterility Vitamin."

Later work, chiefly by Sure, has shown that the richest source of vitamin E is the oil of the wheat embryo. In 1926 Sure showed that cottonseed oil, corn oil, and palm oil produce successful lactation and possess anti-sterility properties, but not to the same extent as wheat oil.

Finally, it has been suggested that vitamin E is divisible into two factors, one thermostable, possessing anti-sterility properties, the other thermolabile, possessing lactation-promoting properties. This lactation factor has been provisionally named "Vitamin F." It is interesting to note that we have here an analogy with the fat soluble vitamins A and D, in that case A being thermolabile and D thermostable.

While the existence of vitamins E and F is still, perhaps, *sub judice*, or at any rate is not accepted by all workers, the evidence in support of it is good and is growing in volume.

In conclusion, it may be said that no vitamin has as yet been isolated, but that the work now in progress in the hands of several investigators gives distinct promise that this will be accomplished in the comparatively near future. It is good to know that Great Britain leads the world in this particular line of research.

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an additional source of nutriment. Nearly all of them contain carbohydrate in some form or another. The most valuable are, doubtless, some of the many forms of malt extract, with or without cod-liver oil. As malt extract contains diastase, its use at the commencement of weaning probably assists the infant's stomach to learn to cope with starchy foods. Some foods contain a mixture of desiccated milk, wheat flour, and malt. When these foods are properly made up the diastase of the malt converts practically all the starch into sugar and dextrines during the process of preparation. Consequently there should be no unchanged starch in the final product. Carbohydrate foods cover a wide range from malt extracts and various malted preparations on the one hand to unchanged ground grains on the other.

Conclusions

The advantages of dried preparations for baby foods are that they are convenient and more or less standardised. For these and other reasons they have a large sale. They have many disadvantages. Nearly always they lack vitamins, and also the proportion of fat, carbohydrate, protein, and salts may be unsuitable. Their sale has led to the use of very optimistic advertising. None of these patent foods is as good as human milk, and there is no evidence that any patent baby food is any better than certified cow's milk that has been properly modified. The origin of the constituents of patent foods is seldom stated and vegetable proteins, which are inferior from the human dietetic point of view, are sometimes used instead of animal proteins. Patent baby foods as a class are certainly convenient when no good supply of fresh milk is available, but there is no doubt that many of them could not be sold if there were proper medico-legal standards regulating the sale of such commodities.

Wrapping Materials for Foodstuffs

By DR. HERMANN SERGER,
Director of the Brunswick Research Station for the Preserving Industries.
(Translated from the German.)

PART II

One of the results of recent legislation and of the increased interest shown by the public in the question of the purity of foodstuffs, will certainly be a rapid extension in the use of suitable wrapping materials. Information on materials such as parchment paper, cellophane, tin-foil and aluminium-foil, is badly needed. We are fortunate in having secured an article upon this subject, written by the Director of a German Research Station. It is a subject to which Dr. Serger has given special attention.

Valuation of Parchment Paper: Chemical Tests

The general valuation of parchment papers, and one that is suitable for the works laboratory, is as follows:

1. *Water.*—4 grammes are dried in a small weighing dish at a temperature of 98° C.
2. *Mineral substances.*—5 grammes are ignited in a platinum or quartz dish.
3. *Mineral substances soluble in water.*—A definite quantity of the aqueous extract (see 4) is evaporated, and the residue ignited.
4. *Substances soluble in water.*—10 grammes of paper are lixiviated four times, each time in 100 c.cm. of water and the combined filtrates made up to 500 c.cm.; 100 c.cm. are evaporated, and the residue dried at 100° C.
5. *Sugar.*—Sugar is determined and calculated as invert sugar in 50 c.cm. of the above solution.

In addition to these chemical tests, it is sometimes desirable to determine the thickness and the tensile strength.

Physical Tests

A test-piece consisting of ten strips of the paper, 1 cm. wide and 10 cm. long, is subjected to a tearing test or to one for ultimate tensile strength. The test for ascertaining the tendency to the formation of mould is carried out by allowing discs of parchment paper, 16 cm. in diameter, to float on a 66 per cent. solution of sugar covered with a bell jar, thus forming a damp chamber. According to *Herzberg*, the "mastication test" should be applied in order to distinguish between genuine parchment paper and substitutes. In contradistinction to the genuine parchment paper, substitutes lose their tenacity in the mastication process. *Ross* uses the different nature of the tear of the two kinds of paper as a distinguishing mark; genuine parchment paper in the moist state should not show any protruding fibres where torn, but imitation parchment paper should produce a fibrous tear. Nevertheless, instances have been known of parchment paper, that was proved to be genuine after the mastication test and other tests had been applied, showing a fibrous tear. One case was a paper made of Japanese fibre and very slightly parchmentized. *Fortini* and *Cecckariki* distinguish genuine parchment papers from substitutes by their resistance to tearing before and after treatment with hot water. Whilst genuine parchment papers in this case give almost uniform values, they are considerably lower in the case of parchmentized papers. If a suitable Schopper apparatus is not available for the purpose, then the resistance to pressure can be determined by means of the Vicat needle. *Lachmann* proposes the following tests: When small pieces of imitation parchment paper are boiled in a diluted solution of caustic soda (1 to 2 per cent.) and then agitated, they are resolved into a fibrous pulp; genuine parchment, even when boiled, is not affected by alkali. A solution of iodine in chloride of zinc is dropped on to the paper, which is then placed into water. Whereas, with imitation parchment papers, the resultant blue-black stain disappears after a few minutes, the strain remains visible for hours in the case of genuine parchment. *Lachmann*, however, considers that the Vicat test suggested by *Fortini* and *Cecckarelli* is not only clumsy, but unreliable. Generally speaking, the requirements that should be fulfilled by parchment paper are that there should be present not more than 8·5 per cent. of moisture, 8 per cent. of sugar, 10 per cent. of substances soluble in water, and 4 per cent. of mineral substances.

Results of Tests

Ten samples bought in the open market were tested, and gave the following results (Tables I and II):

These results show first of all the very different properties of the papers. The tenacity varies between 180 and 1740, and the thickness varies between 0·028 and 0·14 mm. The minimum moisture content was found to be 0·67 per cent., and the maximum 11 per cent. Of the samples that were tested, Nos. 1, 3, and 7 were rejected on account of the substances soluble in water exceeding 10 per cent, and Nos. 4, 5, and 7 were rejected owing to their high moisture content. Nos. 5 and 7 were proved to be imitation parchment papers, because when boiled in water they showed a deficiency in consistency as above indicated.

TABLE I.

GENERAL CHARACTERISTICS.

No.	Appearance.	Consistency.	Odour.	Taste.	Behaviour when Boiled.
1.	White	Strong	Normal	Sweet	Satisfactory
2.	White	Weak	Normal	Normal	Satisfactory
3.	Brown, not normal	Strong	Strong odour when boiled in water	Oleaginous	Satisfactory
4.	Light Grey, not normal	Strong	Normal	Sweetish	Loses consistency when boiled in water; becomes quite soft
5.	White, normal	Weak	Strong	A bitter-sweet after-taste	Loses consistency when boiled in water; becomes quite soft
6.	White, normal	Weak	Strong	Oily	When boiled in water, shows the same consistency as ordinary paper
7.	White, impregnated with paraffin	Weak	Normal	Like paraffin	Becomes quite soft when boiled in water
8.	White, normal	Medium Strong	—	—	Normal
9.	Grey, not normal	Strong	Normal	Saline	Normal
10.	White, normal	Strong	Strong	Oily	Normal

TABLE II.

RESULTS OF CHEMICAL AND PHYSICAL TESTS.

No.	Tenacity.	Thickness.	Moisture.	Mineral Substances.	Mineral Substances in the portion soluble in water.	Substances Soluble in water.	Sugar.	Test for Mould.
		Mm.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	
1.	975	0·045	0·89	0·090	0·060	12·08	5·18	12 days
2.	720	0·028	0·64	0·140	0·010	4·80	Traces	5 days
3.	1740	0·12	1·40	6·110	3·121	11·30	2·50	Satisfactory
4.	965	0·04	11·00	1·999	0·138	3·80	No Trace	Satisfactory
5.	1460	0·14	10·56	2·290	1·306	6·24	3·00	Satisfactory
6.	800	0·033	7·70	0·356	No Trace	No Trace	—	Satisfactory
7.	180	0·04	9·80	0·725	0·214	14·50	Traces	3 days
8.	1135	0·07	7·56	0·015	No Trace	3·88	7·43	Satisfactory
9.	1050	0·12	1·01	0.030	No Trace	4·77	Traces	Satisfactory
10.	800	0·093	6·05	0·110	0·065	6·29	1·10	Satisfactory

2. Cellophane

This is a relatively new kind of wrapping material, and was introduced commercially by the Société Industrielle de Thaon some years before the war. Cellophane has the appearance of celluloid film, nevertheless it is quite different, being derived from viscose. Cellophane is a pure cellulose skin, a colourless, transparent parchment, so to speak. This product is also made in the coloured and embossed form, and in this form it has a multiplicity of uses as a material for wrapping confectionery, as bags for holding coffee, as show cartons for dried vegetables, and so on. Like parchment paper, cellophane is sensitive to water, and is a semi-permeable membrane. When brought into contact with water, the material increases in volume and assumes a more or less wavy surface. The use of cellophane, therefore, cannot enter into the question where a wrapper is needed that is impermeable to water and that will prevent evaporation, as, for example, in the case of gingerbread in slices. But for all that, various uses have been found for this material as a wrapper for different kinds of foodstuffs.

As is well known, marmalades in glasses or jars are covered over with a disc of parchment paper, partly to prevent the formation of mildew and partly to prevent the upper surface of the contents from becoming contaminated. The object is only imperfectly attained by the use of discs of parchment paper, because there are quite a number of parchment papers which actually favour the formation of mildew on the surfaces of the preparations mentioned, and certainly do not prevent it. Even supposing the discs of parchment paper prevent the formation of mildew and afford protection against contamination, they have the disadvantage of concealing the surface of the jam which is placed purposely in glasses for the sake of appearance. At the outset, cellophane appeared to have overcome the disadvantages accruing from the use of parchment paper as a covering. It was assumed that cellophane did not have any tendency towards the formation of mould, and that it remained permanently unchanged. The transparency of the cellophane discs entirely eliminated the disadvantage of the parchment paper discs. There still remained to test the ability of cellophane to resist moulds. Tests made with different kinds of jams, in addition to the preliminary and practical tests, prove that the cellophane discs are admirably suitable for use as a covering for marmalades and jams. In no circumstance do the cellophane discs exhibit any tendency towards the formation of mould. They remain permanently unaltered with regard to transparency, and thus they permit the marmalade or the jam to be viewed not only through the glass, but also through the top—through the cellophane disc itself. When used for this purpose, the fact must be taken into consideration that cellophane, when brought into contact with water, increases its volume. In order, therefore, to prevent the superimposed disc from becoming deformed into a wavy shape, it should be previously slightly moistened.

3. Tinfoil

This wrapping material consists of thinly rolled tin. As the tinfoil comes into direct contact with the foodstuff, it must not contain more than 1 per cent. of lead.

Various articles and foodstuffs are wrapped in tinfoil. This wrapping material has an undoubted advantage over the materials previously mentioned, in so far as it is absolutely impermeable to air and moisture, provided, of course, that the metal-foil is not injured. When the metal is brought into direct contact with moist foodstuffs, such as cheese, there is a risk of the tin being dissolved and thus contaminating the foodstuff, which can thereby become injurious to health. Cases of so-called tin poisoning, however, are of extremely rare occurrence, and are mainly attributable to an idiosyncrasy towards tin salts. In order to prevent solution of the tin, the

(*Continued on page* 102.)

The Strength of Flour

By D. W. KENT-JONES, Ph.D., B.Sc., F.I.C.,
Chief Chemist, Messrs. Woodlands, Ltd., Dover.

The following notes on the strength of flour are taken from a thesis entitled "A Study of the Effect of Heat upon Wheat and Flour especially in Relation to Strength," which was presented by the author to London University for a Ph.D. degree.

IT IS difficult to define what precisely is meant by this term, although such wheats as Manitoba are obviously strong and others such as English obviously weak. Very often the baker means one thing and the miller another. The generally accepted definitions of strength are: "A strong wheat is one which yields flour capable of making well-piled loaves," and "strength is defined as the measure of the capacity of the flour for producing a bold, large-volumed, well-risen loaf." Thus it appears that at present the only way of judging strength is to bake a loaf. Unfortunately baking is a general term describing a large number of complicated changes which can be varied according to the exact procedure and the skill of the operator. One baker may have one certain way of fermentation, and from a certain flour obtain a "large, well-piled loaf." This flour is therefore, by definition, strong. Again, the same baker using the same procedure but a different flour might make a loaf, still large and well-piled, but not so large and well-piled as the first. One must say with him, therefore, that the second flour was weaker than the first. A second baker using a slightly different method might quite conceivably obtain the better loaf with the second flour. In his view the first flour is a little weaker than the second. Definitions on the size of loaf are open to serious objections unless it is realised that a loaf may be small from at least two causes: too weak flour and too strong flour. A too strong flour might cause a small loaf, especially with some methods of baking. A flour has a different strength according to the baker who uses it. There is also the fact that different flours are wanted for different kinds of bread. Also in the general tendency to correlate strength with size of loaf, the matter of texture of the loaf should not be forgotten.

Size of Loaf

The production of a large loaf depends upon a number of factors, even excluding variations in baking. By baking is meant, not only the actual cooking of the loaf in a hot oven, but also the comparatively long and slow fermentation period which precedes it. A dough must be "ripe" by fermentation before it is placed in the baking oven, or it will not give as good a result in the final loaf as it should do. Again, skill in moulding can influence size of loaf tremendously. The gas production in the fermenting dough may make or mar the production of a large loaf.

Other Factors

Take for example two very different flours—a strong Manitoba and a weak English. There is no doubt that the Manitoba is strong, and the English very weak. But suppose, as it happens in some years, the Manitoba is greatly lacking in diastatic value, then it will not produce a large, well-piled loaf, or a bold, large-volumed, well-risen loaf. Is the Manitoba to be called a weak flour in consequence? The Manitoba baked with a little malt extract will give the necessary bold, large-volumed, well-piled loaf. Again, if we add to such a Manitoba flour 10 to 20 per cent. of a particularly weak English flour of high diastatic activity, the resultant loaf will be beautifully large and well-piled. Are we going to say that by adding a little flour, known and admitted to be very weak, we have produced strength in the Manitoba flour, which, as it only previously gave a small loaf, must have been by definition weak? But many rather weak flours treated with chemical improvers will likewise show a big improvement in baking properties, though the difference may not be so marked as in the case of the Manitoba flour. In this latter case a small pinched-up loaf is obtained when baked alone, and in the other (with malt) a particularly fine, bold, appetising, and beautifully textured loaf is produced. There are, however, looking at the matter broadly, two main conditions for the production of the desired big and nicely textured loaf. These are:

(1) There must be sufficient sugars present and sufficient diastatic activity to produce sugars, as the original ones are used up by the yeast, so that there is always a sufficiency of gas production to distend the dough fully.

(2) The proteins of the dough must be sufficient in quantity and good enough in quality to hold the gas produced. Further, it must be remembered that it is possible to have a flour too strong to produce a good loaf when baked alone. That is, although its gas production is normal and ordinarily sufficient, there is present a too large quantity of very tough gluten, which the normal quantity of gas is unable to extend properly. The addition of malt extract is here very useful, as not only does it stimulate further the gas production so that it becomes abnormally great to deal with the abnormal position, but the malt extract contains enzymes which have a destructive and breaking down influence on the proteins, and this helps to mellow down the too tough gluten. Of course, blending with a weak flour, lacking in gluten, is a similar way of dealing with such flours which unfortunately are only too rare.

Behaviour of Dough

Are we, then, to call a flour, whose gluten content is good both in quantity and quality, weak because its enzymic activity is small? The whole affair is merely

one of definition. It has been the author's custom to judge the strength of flours by the way the dough behaves—that is, its tenacity, elasticity, and freedom from runniness and stickiness. This excludes to a certain extent the gas production and enzymic activity condition. That is, flour may be classed as strong which does not necessarily make a big loaf when baked by itself. Normally, of course, gas production is sufficient, and the loaf is large and well-piled. Exceptionally, it is possible to have a flour (such as the Manitoba mentioned) which by itself does not give the necessary loaf to be called strong under the usually accepted definitions, but which, as it gives a tough and resilient dough, is accepted by the author as strong. In other words, strength is looked upon as the power of retaining the gas, and the gas production factor is not included in the definition. Gas production is very largely under the immediate care of the baker, and the addition, for example, of one to two pounds of brown sugar per sack, or a pound of malt extract, will usually overcome any difficulties arising here.

Conclusions

Therefore, strength may be regarded as the factor which will normally produce large, well-piled loaves, provided that the gas production is sufficient, and that in practice this can often best be judged from the behaviour and the properties of the fermented dough. Another useful viewpoint is the power of a flour to carry a known weak flour and still produce a good loaf. Such a method will clearly show when a flour is so strong that it becomes over strong. In such cases the over-strong flour will not make a good loaf when baked alone, but will do so when carrying a very large proportion of the weak flour.

(*Continued from page* 100.)

foodstuff is usually not brought into direct contact with the tinfoil, but is wrapped first of all in parchment paper. This effectively prevents the foodstuff from being injured.

4. Aluminium-foil

By rolling out aluminium it is also possible to get foil which in appearance is similar to tinfoil, and can be applied to similar purposes. In contradistinction to tinfoil, aluminium-foil can be made not only smooth, but also lightly rippled, dotted, or stamped with designs. Aluminium-foil is somewhat harder to the touch than tinfoil, and is more easily broken. Further, it does not offer the same resistance to chemical action as tinfoil does, due, of course, to the natural characteristics of the metals. Aluminium-foil is comparatively easily attacked by liquids containing cooking salt, white distintegration marks being formed. Since aluminium salts are not poisonous and have no great effect, aluminium-foil is superior to tinfoil as a wrapping material for foodstuffs. But since the products of disintegration of the aluminium-foil might possibly contaminate the foodstuff, and since the aluminium salts are liable to produce certain superficial discolorations in the provisions, it is always advisable, when using aluminium-foil, to wrap the foodstuff first of all in parchment paper, as in the case of tinfoil.

London Gazette Information

Voluntary Liquidations.

(Note.—Voluntary liquidations may, in some instances, refer to companies in course of reconstruction.)

H. S. WHITESIDE & CO., LTD. Resolved, June 29th, that the company be wound up voluntarily, and that R. J. Blackadder, C.A., Norfolk House, Norfolk Street, W.C., be appointed liquidator. Further, that the liquidator be authorised to sell the company's assets and goodwill at a price to be agreed to Gilbart, Ltd. Such agreed price in any event to be sufficient to cover the costs of liquidation and all the company's debts and liabilities (including capital), and out of the proceeds to pay and discharge such debts and liabilities in full.

The liquidator is directed to authorise and consent to Gilbart, Ltd., changing its name to H. S. Whiteside and Co., Ltd.

(This notice is given to comply with the Companies Acts. All creditors have been or will be paid in full, and arrangements are being made for the business to be carried on as before under the same name.)

HASLAM & SONS, LTD. Resolved, July 8th, that the company be wound up voluntarily, and that J. G. P. Ibotson, C.A., 90, Cannon Street, E.C., be appointed liquidator.

PACKER (THE TABLE DELICACY SPECIALIST), LTD. Resolved, July 4th, that the company cannot, by reason of its liabilities, continue its business, and that it is advisable to wind up the same; and accordingly the company be wound up voluntarily. Mr. L. Aspinall, I.A., 32, Talbot Road, Blackpool, is appointed liquidator.

Bankruptcy Acts, Receiving Order.

DEAL, EDGAR REGINALD, 169, Peckham Rye, S.E., and WHEELER, ARTHUR HENRY, of 63, Rosemary Road, Peckham, S.E., carrying on business in partnership together under the style of "Deal Wheeler," at 27, Victoria Road, Peckham, S.E., as wholesale grocers and sundriesmen. Receiving Order, June 20th. Debtor's petition. Adjudication, June 20th.

Release of Trustee.

HARRIS, ALBERT ERNEST GEORGE BERTRAM, trading and described in the Receiving Order as "A. Harris & Co.," 56, Orford Road, Walthamstow, manufacturing confectioner. (1060 of 1924) Trustee: E. Parke, Official Receiver, Bankruptcy Buildings, Carey Street, W.C. Release, June 20th, 1927.

Companies Acts, Release of Liquidators.

BRITISH MARGARINE TRADE SUPPLIES, LTD, The Morpeth Refining Works, Canning Street, Birkenhead. (00469 of 1922) Liquidator: G. D. Pepys, Official Receiver and Liquidator, 33, Carey Street, W.C.2. Release, July 5th, 1927.

Commercial and Legal News

(The Editor does not accept responsibility for any errors which may occur in the following notices.)

New Companies

The undermentioned particulars of New Companies recently registered are taken from the Daily Register compiled by Jordan and Sons, Ltd., Company Registration Agents, 116-118, Chancery Lane, London, W.C.2.

KIPLING, LIMITED. (222608) Registered June 17, 1927. 59, Gracechurch Street, E.C.3. To carry on the bus. of importers and/or mnfrs. of and dlrs. in chewing gums and cachous of all kinds, etc. Nom. cap.: £5,000 in £1 shs. (4,500 "A" and 500 "B").

Dirs.: E. Kipling (ch. and permt. gov. dir.), address not stated.
J. A. Horn, address not stated.

Qual. of gov. dir., the holding of 500 "B" shs.

Subs.: J. Paine, 4, War Seal Mansions, Fulham Rd., S.W.6 (clk.).
H. F. Pearce, 118, Manor Place, S.E.17 (clk.).

S. T. HARRIS, LIMITED. (222620) Registered June 17, 1927. 68, Camp Hill, Birmingham. To carry on the bus. of bakers and confectioners formerly cd. on at Camp Hill, Stratford Road, and Little Broom Street, Birmingham, as "S. T. Harris." Nom. cap.: £2,500 in £1 shs.

Dirs.: Mrs. F. Harris, 56, Southam Road, Hall Green, Birmingham.
Miss M. E. Harris, 56, do.
S. T. Harris, Witney Cres, Shirley, nr. Birmingham.

ENGLISH CATTLE PRODUCTS, LIMITED. (222642) Regd. June 18, 1927. To take over the bus. of a mnfr., cleaner, exporter and importer of sausage casings and packing house by-products, etc., now cd. on at 100, St. John's Street, West Smithfield, E.C., as the "English Cattle Products Co." Nom. cap.: £1,000 in £1 shs.

Permt. dirs.: A. W. Hillman, 209, High Road, Kilburn, N.W.6 (chairman).
H. R. Gill, 14, Plympton Avenue, Brondesbury, N.W.6 (mang. dir.).

LOUIS DREYFUS & CIE. (F.2634) Regd. June 14, 1927. Holland House, Bury Street, E.C. Incorpd. in France. To carry on the bus. of dlrs. in cereals and all other kinds of merchandise, etc. Nom. cap.: 20,000,000 francs.

Persons authorised to accept service:
F. Gamburg, of Holland House, Bury Street, E.C.
L. Muller-Rowland, do.
A. E. Lawrence, do.

DAIRY CREAM ICES (MIDLANDS), LIMITED. (222654) Regd. June 20, 1927. To carry on the bus. indicated by the title. Nom. cap.: £10,000 in £1 shs.

Dirs.: H. V. Watson, The Pines, Gaddesby, Leics. (permt. gov. dir. and ch.).
E. G. Richardson, 41, Bedford Row, W.C.1.
R. Russell, Marie Jose, Elms Road, Leicester.

Qual. of gov. dir. and ch., the holding of £2,000 shs.; of other dirs., £500 shs.

CREAM ICES (BRISTOL), LIMITED. (222652) Regd. June 20, 1927. To carry on the bus. of mnfrs. of and dlrs. in ice cream, etc. Nom. cap.: £1,000 in £1 shs.

Dirs.: F. J. Weaver, The Poplars, Fishponds, Bristol.
A. E. Savery, 129, Redland Road, Bristol.
J. J. Plummer, 10, Court Road, Horfield, Bristol.

Qual. of dirs., £100 shs.

OSWALD BLACK & CO., LIMITED. (222678) Registered June 21, 1927. To take over the bus. of wholesale confectioners, etc., cd. on at 102, Tudor Road, Leicester, as "Oswald Black & Co." Nom. cap.: £1,000 in £1 shs.

Dirs.: C. O. Black, 162, Belgrave Road, Leicester (mang. dir.).
E. C. Kennedy, Tan-y-coed, Ethel Road, Leicester.
J. H. Preston, Main Street, Narborough, Leics.

Qual. of dirs., £250 shs.

WADSWORTH (HUDDERSFIELD), LIMITED. (222712) Regd. June 22, 1927. To carry on the bus. of sugar boilers, chocolate makers, bakers and confectioners, etc. Nom. cap.: £3,000 in £1 shs. (1,500 preference and 1,500 ord.).

Permt. dirs.: G. Bradford, 49, Carr St., Marsh, Huddersfield.
T. S. Taylor, 51, Carr St., Marsh, Huddersfield.
J. Wadsworth, 20, Armitage Rd., Milnsbridge, Huddersfield.

Qual. of dirs., £250 shs. Remun. of dirs. (except mang. dir.), as voted by the co.

WEIGALL AND HARDEN, LIMITED. (222778) Regd. June 24, 1927. 33, Eastcheap, E.C.3. To buy, sell, import and export, and deal in tea, coffee, rubber, tobacco, and sugar, etc. Nom. Cap.: £22,500 in 20,000 ordinary shs. of £1 and 50,000 deferred shs. of 1s.

Dirs.: H. D. Harden, 21, Adelaide Crescent, Hove.
T. H. Weigall, 1, Palmer Street, Westminster, S.W.1
Louis Blaise Vicomte de Sibour, 104, Eaton Place, S.W.1

Qual. of dirs., £100 shs. Remun. of dirs. (except mang. dir., if any), £50 each per annum (chairman £50 extra).

BOURNE AND HILLIERS CREAMERIES, LIMITED. (222788) Regd. June 25, 1927. To take over the business of wholesale and retail dairymen, etc., heretofore cd. on at 197 & 66, High Street, Rochester, Kent, as "Hilliers' Creameries," and as "F. Bourne," Belgrave Dairy, Strood, Kent, and elsewhere. Nom. Cap.: £20,000 in £1 shs.

Permt. dirs.: W. Hillier, 1, Castle View Rd., Rochester.
J. F. Hillier, 197, High Street, Rochester.
F. Bourne, 226, High Street, Chatham.
F. H. B. Bourne, "Roydon," Maidstone Rd., Chatham.
Qual. of dirs., £250 shs.

BREWSTER AND FROST, LIMITED. (222789) Regd. June 25, 1927. 69 & 70, Central Markets, E.C.1. To carry on the bus. of dlrs. in and importers and exporters of meat, live cattle and sheep, etc. Nom. cap.: £30,000 in £1 shs.
Dirs.: W. T. Johnson, 40, Talbot Rd., Highgate, N.6 (ch. and mang. dir.).
Mrs. E. B. Frost, 32, Ferncroft Avenue, Hampstead, N.W.3 (both permt.).
T. W. Wrigglesworth, 17, Fernleigh Rd., Winchmore Hill, N.
R. Scott, "Edgwood," Woodville Rd., New Barnet.

E. B. BRADSHAW & SONS, LIMITED. (222864). Regd. June 29, 1927. To take over the bus. of millers, corn factors and mchts., etc., cd. on at the Bell Mills, Driffield, Yks., as "E. B. Bradshaw & Sons." Nom. cap.: £25,000 in £1 shs.
Dirs.: J. B. Bradshaw, Bell Mills, Driffield (permt. mang. dir.).
P. S. Bradshaw, 26, Lockwood Street, Driffield.
A. E. Bradshaw, 7, Skerne Road, Driffield.
Special qual. of 1st dirs., 2,500 shs.; qual. of other dirs., £500 ord. shs.

VITAMINS, LIMITED. (222951) Registered July 1, 1927. To carry on the bus. of dlrs. in grain, flour, and all farinaceous compounds; and to enter into an agreement with International Foods, Ltd. Nom. cap.: £25,000 in £1 shs.
Dir.: E. R. B. Farrer, 19, Lansdowne Crescent, Holland Park, W.
Qual. of dirs., £1.
Sub.: J. M. Napier, 28, Cecil Court, Hollywood Rd., S.W.10 (solr.).

JOE LOWE FOOD PRODUCTS CO., LIMITED. (222968) Regd. July 2, 1927. 34, Great Prescott Street, Aldgate, E.1. To carry on the bus. of mnfrs. of and dlrs. in requisites of all kinds for bakers, confectioners, and pastrycooks, etc. Nom. cap.: £2,000 in £1 shs.
Dir.: D. M. A. Hawes, 99, Mansell Street, E.1
Qual. of dirs.: none required. Remun. of dirs., as voted by the co.

BRODE BROTHERS, LIMITED. (222985) Regd. July 4, 1927. 19, St. Dunstan's Hill, E.C.3. To enter into an agreement with W. Penny, trading as Brode Brothers, barley mchts.; and to carry on the bus. of millers, mill owners, corn factors and mchts., maltsters, etc. Nom. cap.: £10,000 in £1 (5,000 preference and 5,000 ord.).
Dirs.: Wm. Penny, 309, White Horse Lane, South Norwood, S.E.25.
H. F. Tattersall, Glenburn House, Pinner.
R. W. West, 15, Connaught Gardens, N.10.
Remun. of dirs., as voted by the co.

CONTINENTAL GRAPE PRODUCTS, LIMITED. (223017) Regd. July 5, 1927. 2, Norfolk Street, Strand, W.C.2. To carry on the bus. of mnfrs. of wines, liqueurs and cordials, etc. Nom. cap.: £20,000 in 40,000 deferred shs. of 1s. and 18,000 ord. shs of £1.
Dirs.: to be appointed by the subs.
Remun. of dirs., as voted by the co.
Subs.: J. A. Bush, 26, Arnold Gardens, N.13 (acct.).
J. V. Broome, 247, Archway Road, N.6 (clk.).

KENT CANNING COMPANY, LIMITED. (223051) Regd. July 6, 1927. To engage in the bus. of canning, preserving, treatment, selection or utilisation of fruits, vegetables and other products, etc. Nom. cap.: £6,000 in £1 shs.
Dirs.: F. B. Bradley-Birt, Birtsmorton Court, Worcestershire.
H. D. Gregson, Denefield, Valley Rd., Kenley, Surrey.

BRITISH CANNING TRUST, LIMITED. (223037) Regd. July 6, 1927. To engage in the bus. of canning, preserving, treatment, selection, or utilisation of fruits, vegetables, and other products, etc. Nom. cap.: £6,000 in 5,000 preference shs. of £1 and 20,000 ordinary shs. of 1s.
Dirs.: F. B. Bradley-Birt, Birtsmorton Court, Worcestershire.
E. R. Jones, address not stated.
Subs.: A. G. Willoughby, 12, Guernsey Grove, Herne Hill, S.E.24 (clerk).
Winifred E. Lott, Victory House, Balfour Road, Ilford (clerk).

PLANTERS NUT AND CHOCOLATE CO., LTD. (F.2630) Regd. May 17, 1927. Cromford House, Cromford Court, Market St., Manchester. Incorporated in Canada. To carry on the bus. of mnfrs. of and dlrs. in food and food products, etc. Cap. stock: 200,000 dollars in 100 dollar shs.
Person authorised to accept service: J. W. Johnston, of Cromford House, Cromford Ct., Market St., Manchester.

Legal News

In the King's Bench Division on July 6, Mr. Clifford Edward Green, wholesale sugar merchant, of 7, Commercial Street, Whitechapel, secured judgment against Shrupsal Teacher, of Fournier Street, Spitalfields, for £375 for sugar supplies.

Counsel for plaintiff said the action was brought against defendant and H. Chodak, of Brick Lane, Spitalfields, who had traded in partnership, but Chodak had already submitted to judgment.

Teacher alleged that he had ceased to be a partner before the goods were supplied, but that was not the fact.

Evidence having been given, Mr. Justice Horridge entered judgment for plaintiff, with costs, holding that Teacher was still a partner at the time the goods were supplied.

Recent Patents

The following abstracts are obtained from recently published copies of the "Illustrated Official Journal" (Patents) by permission of the Controller of H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

269,048. **Closures for bottles, etc.** E. GOLTSTEIN, AND E. MEYER. September 3, 1926.
Materials, special, for packing-discs; coatings for packing-discs.—Packing-discs for bottles, etc.; closures are formed of a textile material or of paper, cardboard, etc., and are covered on one or both sides with an elastic cuticle composed of nitro-cellulose treated with triacetic ester of glycerine, tricresyl ester of phosphoric acid, ethyl ester of phthalic acid or other gelatinising agent.

269,113. **Moulding confectionery.** BERTEN AND CO., GES. January 31, 1927.
Candy rolling machines of the conical roller type are adapted for the production of a hollow or filled rope of confection by the provision of a wooden cone located above the rollers centrally of the sugar cone. The cone is held against rotation and is jointed to a block adjustably supported in a guide. A liquid filling may be introduced from a container communicating through a pipe and tube with a bore in the cone.

269,248. **Biscuits, etc.** PEEK, FREAN AND CO., LTD., AND L. RONDOLIN. January 13, 1926.
For making biscuits, etc., a layered product is produced mechanically from a single thinned sheet of dough which is caused to descend vertically from the thinning rolls to a receiving member, the parts being so arranged that between this member and the rolls relative movement takes place any desired number of times equally from side to side with regard to the rolls in a direction at right angles to the ultimate delivery motion of the product.

269,359. **Biscuit making and packing apparatus.** SHREDDED WHEAT CO., LTD. June 9, 1926.
A machine for making and packing cereal biscuits and other food products comprises means for forming the biscuits and transferring them to an oven conveyer, delivers mechanism which transfers them to a device where they are packed into cartons and means for sealing the cartons.

269,384. **Fats.** K. ERSLEV, 60, KWAKKENBERGSCHEWEG, NIJMEGEN, HOLLAND. August 17, 1926.
Plastic and pliable fats are obtained from naturally occurring hard and brittle fats, such as coconut oil and palm kernel fat, by adding to the latter ½ per cent. or more of a gummy plastifying substance, such as unvulcanised rubber, rubber latex, chicle, kauri gum, or gum elastic. A solution of the plastifying substance—*e.g.*, in ether or carbon-disulphide—may be added to the molten fat, the solvent being subsequently distilled off or the plastifying substance may be added directly to the fat, and the mixture be allowed to stand, a heated gas or vapour, preferably of an inert nature, being simultaneously or subsequently passed through the mass.

269,416. **Solidifying emulsions by cooling.** W. G. SCHRÖDER. October 15, 1926.
Solidifying and then removing films; rollers, hollow.—Apparatus of the rotary drum and scraper type for solidifying margarine emulsions, etc., is provided with an air cooler, built up with the apparatus, through which is passed air to be circulated through a jacket space around the outside of the drum. The emulsion is maintained in circulation through the receiver-distributor to prevent premature cooling, and the construction of the drum and scraper is improved.

269,468. **Cutting dough, etc.** T. L. GREEN. June 1, 1926. (Not yet accepted.)
Stream-cutting machines.—Lengths are severed from strips of dough or other plastic material supported upon a web passing beneath a reciprocatory cutter by means of a rocker which periodically raises the web into range of the cutter.

269,552. **Making wafer biscuits.** ANCIENS ETABLISSEMENTS, A. SAVY, JEAN-JEAN, ET CIE, AND BAKER, PERKINS, LTD. April 12, 1927. (Not yet accepted.)
In a wafer baking machine wherein all the moulds are not designed to produce the same type of wafer, the wafers are automatically sorted when leaving the moulds. This is effected by discharging the wafers on to a number of pivoted traps which, when aligned, form a continuous inclined surface, but, when displaced, allow the wafers to slide into any one of a number of receivers.

269,574. **Fishing vessels; freezing fish.** BORSIG GES., AND DEUTSCHE WERKE KIEL AKT.-GES. April 14, 1927. (Not yet accepted.)
A plant for freezing fish on board fishing steamers by circulation of cooled brine.

269,576. **Food preparations.** P. N. WOO. April 14, 1927. (Not yet accepted.)
Sodium glutamate as an edible product suitable for flavouring soups, vegetables, etc., and which can be used in water as a substitute for beef tea is made by dissolving vegetable protein in an acid, preferably a hydrohalide acid, at a temperature below the coagulation point of the protein, adding a small quantity of metallic tin, hydrolysing the mixture, neutralising with an alkali and mixing the liquor with a precipitating liquor such as alcohol. In an example, moist wheat gluten is dissolved in warm hydrochloric acid, a small quantity of finely granulated tin is added and the mixture is heated under pressure with steam. The tin accelerates the hydrolysis and removes any arsenic in the acid. The solution is filtered, concentrated, and the glutamic acid hydrochloride is allowed to crystallise. The crude hydrochloride is neutralised with slight excess of caustic soda, which precipitates

any tin present, the sodium and ammonium chlorides are separated by evaporation and crystallisation, and the mother liquor is added to alcohol to precipitate the sodium glutamate.

269,610. **Food preparations particularly for animals.** A. P. HUNT. November 24, 1925.

Milk preparations.—A moist acid food, particularly useful for conditioning lower animals such as pigs and chickens, is made from butter-milk, skimmed milk, or the like, by developing lactic acid therein from the lactose of the milk, then subjecting the milk to such heat treatment and agitation as to precipitate the casein content in non-adherent particles, and finally evaporating to produce a highly acid sterilised product having not more than 35 per cent. of solids. The milk, inoculated, if desired, with a special culture such as B-Bulgaricus, is initially heated to a temperature of 75° F., or slightly higher, until a total acidity of between ·78 and 1·5 per cent. is developed. Then with active agitation the temperature is raised slowly to 125° F., and then more rapidly to 180° to 185° F. The final evaporation is effected by a long continued relatively low heat treatment in a condensing apparatus or vacuum pan, giving an increasing concentration of lactic acid which may ultimately be as much as 6 per cent. of the product.

269,678. **Sterilising, etc., liquids.** R. L. MUNDAY. January 25, 1926.

In the sterilisation, pasteurisation, or like heat treatment of liquids, such as milk or cream, the air is first removed from the liquid by filming or spraying it or agitating it in bulk in a vacuum chamber or tank from which it is removed by a positive-action pump for the subsequent heat treatment under vacuum, the vacuum being maintained throughout the process.

269,796. **Colouring food; toilet powder.** A. O. MORRIS. October 12, 1926.

A powder which can be used as a toilet powder, etc., and for colouring confectionery and foodstuffs other than those set out in the parent specification is made by dissolving colour in a relatively large quantity of water, spraying the solution on to a relatively large quantity of starch, preferably maize starch, and mixing this coloured starch in small proportion and as a dry powder with a main bulk of cereal flour, such as cornflower.

269,798. **Moulding dough.** SOC. ANON. DES ATELIERS SPILTOIR, RAPPEZ, HECQ. October 13, 1926.

A dough rolling machine of the type comprising a rotary drum surrounded by a helical channel.

268,603. **Sterilising milk, etc.** F. HUMBEECK. June 23, 1926.

Milk, etc., is sterilised in hermetically sealed crown-stoppered bottles or other containers by progressive heating by steam under pressure in a chamber in which the bottles are kept in rotation about a horizontal or inclined axis. The bottles are then allowed to cool gradually in the open.

268,609. **Cutting wafer biscuits.** H. VAN CAUWENBERGH AND B. VAN DOESBURG. July 12, 1926.

Severing by tearing.—In a machine for cutting baked wafer biscuits in two directions at right angles, the wafers are carried in a tray past an adjustable stationary frame with vertical severing wires by which the wafers are cut into strips. The strips are then carried by a tray past wires and cut into sections. The wafers are held in the trays by hinged fingers.

268,618. **Dough-working machines.** W. MOHR. July 29, 1926.

Stream-cutting machines; extrusion machines.

268,626. **Confectionery.** C. GÖPEL. August 11, 1926.

Depositing machines.—Apparatus for removing pralines from starch moulds.

268,653. **Baking-pan liners.** G. SHERMAN. September 20, 1926.

268,655. **Vitamins.** L. A. AGOPIAN. September 24, 1926.

Concentrated preparations of vitamin A are obtained by crushing or macerating fresh vegetables or fruit immediately treating both the juice and the pulped residue with a reagent such as acetate of lead or of copper or both, separating, washing, drying, and crushing the precipitate or cake, and then subjecting it to a cold extraction process, as with petroleum ether, and finally concentrating in vacuo. The product may be purified by treatment with methyl alcohol or by saponification with alcoholic potash. The preparation may be mixed with an oil such as ground-nut oil or olive oil, or with an edible fat such as margarine. Specification 168,903 is referred to.

268,687. **Sausages.** C. H. VOGT. December 3, 1926.

In making skinless sausages, the sausage meat is first shaped and allowed to set in moulds, and after removal therefrom is treated—*e.g.*, by smoking, so as to convert the outer layer into a tougher skin-like substance. In the process described, the sausage meat is ground more finely than usual and filled into tubular or other moulds which may be of aluminium. Ice may be added to the meat during grinding. The filled moulds are kept for about twenty-four to forty-eight hours at a temperature of about 30° to 48° F., and the sausages then ejected—*e.g.*, by plungers. The sausages are next smoked for about two to four hours at a temperature starting at about 120° F. and progressively increased to about 165° F. The smoking forms the tough outer layer and improves the keeping qualities. The smoked sausages may then be cooked for about six to eight minutes at about 170° F.

268,693. **Breaking, grinding, and feeding lumpy flour.** E. BREUNIG. December 13, 1926.

269,911. **Medicinal chewing-gum.** HEALTH PRODUCTS CORPORATION. April 21, 1927. (Not yet accepted.)

Chewing preparations; medicines for internal use; coatings for medicines; sweetmeats; coating confectioners' goods.—Phenolphthalein, pepsin, or other medicament is introduced into chewing-gum in the form of relatively hard pellets which are uniformly distributed in the gum during manufacture. The pellets may be formed by moistening crystals of sugar in a rotating pan with water or sugar syrup and adding phenolphthalein to form a coating, or by moulding a paste of phenolphthalein, glucose, and gum arabic. In either case the pellets may be rendered less fragile by means of a hard sugar coat-

ing. The pellets are added to the cooked mixture of chicle and other ingredients in the kettle and are uniformly distributed by kneading and stirring. The mass is then removed from the kettle, cooled, formed into strips, scored to the required dimensions by rollers, and broken in a revolving pan. The pieces so formed may be sugar-coated by moistening them whilst in a revolving pan with a solution of sugar and gum, sprinkling with dry sugar, and drying by a current of air; these steps being repeated until the required thickness of coating is attained. Oil of peppermint or other flavourings and colouring matter may be added to the coating materials.

269,923. **Preserving food.** M. AVANZI. April 22, 1927. (Not yet accepted.)

A process for the preservation of tunny or other fish, or other animal or vegetable food materials, consists in first treating the materials in a centrifugal apparatus for the purpose of drying and draining off blood, if present. The material is next conveyed in succession through a steam cooking and a drying apparatus and is then packed in boxes which are filled with oil in a vessel which is first exhausted before introducing the oil. The boxes are then sterilised in a tubular steam-heated steriliser.

269,952. **Pectinous products.** D. R. NANJI AND F. J. PATON. December 28, 1925.

Gums, carbohydrate.—Pectin extracts suitable for jam, jellies, confectionery, etc., are obtained by treating pectinous plant materials with very dilute solutions of salts, which by effecting ionic exchange with the insoluble pectin compounds, render them soluble, so that they may be substantially completely extracted. There is simultaneous formation of soluble pectinous salts, whose solubility depends on the kation of the added salt, and of an insoluble or soluble salt of calcium, magnesium, or iron with which metals the pectin is largely combined in the raw material. Salts of ammonium, or of the alkali metals especially those capable of forming insoluble compounds with the alkali earth metals, such as ammonium sulphate, phosphate, citrate, tartrate, etc., are preferred. If the raw materials are excessively acid, the acidity may be reduced by electrodialysis; while the pectin extract may be acidified by addition of the requisite quantity of acid for jellification or by the removal by electrodialysis of the kation of added salt, added in excess of the requirements of the main process. The jellifying power of the extract may be augmented by the small addition of calcium salts. In an example, one ton of dried apple pomace is treated with 1,000 gallons of a ·1 to ·5 per cent. solution of ammonium tartrate at 120° C. under pressure. The extract is pressed out and the residue again extracted and so on. The extracts are used then to treat fresh pomace, and may be treated by absorbents, filtered or centrifuged. The concentrated extracts jellify when acidified and heated with sugar, or may be preserved by addition of sugar or other materials such as toluene, or dried to solid form by evaporation. The process may be applied to making jam from dried fruits such as dried prunes, the prunes being extracted with ammonium tartrate, etc., solution, and the digestion mixture mixed with sugar and acid, and, if necessary, additional pectin preparation.

270,029. **Sterilising milk cans, etc.** J. MORTON. February 17, 1926.

270,030. **Sterilising milk, etc.** R. SELIGMAN. February 17, 1926.

270,052. **Preserving liquid eggs, etc.** UNITED YEAST CO., LTD., W. SALMON, AND F. JACKSON. March 18, 1926.

Liquid eggs or their yolk or albumen constituents are preserved by addition of ammonia solution in such an amount as to retard or inhibit bacterial activity and reduce the hydrogen ion concentration. The amount of ammonia added varies according to the length of the preservation period, and is preferably such that when the materials are required for use the free ammonia content does not exceed ·25 per cent. by weight. A 1 per cent. ammonia solution may be used, the temperature of mixing not exceeding 70° F., and the materials may then be stored in hermetically sealed containers.

270,202. **Coating confectioners' goods.** M. ROBERTSON. January 6, 1927.

270,296. **Vitamins; margarine; treating substances with radiations.** H. C. E. TILLISCH. April 26, 1927. (Not yet accepted.)

In order that not only the antirachitic vitamin but also the fat soluble vitamin A may be produced in oil or fat by irradiation with ultra-violet light the process is conducted in the absence of oxygen. Valuable edible fats and margarines from vegetable fats can thus be obtained.

270,304. **Moulding dough.** O. KREMMLING. April 27, 1927. (Not yet accepted.)

270,495. **Bakers' ovens.** T. PATSCHER. May 19, 1926.

270,509. **Deodorising milk.** TE AROHA DAIRY CO., LTD., AND H. L. MURRAY. June 11, 1926.

270,706. **Treating cereals.** TREU-HAND-GES., BARTMANN AND CO. May 2, 1927. (Not yet accepted.)

Decorticating treatment by damping; treating with air and gases; treating with radiations.—To prevent intermolecular respiration during the steeping of grain for the purpose of softening to obtain a satisfactory separation of the husks from the endosperm the steeping liquor is supplied, constantly or intermittently, with finely divided air or oxygen or similarly acting gases, or the grains are exposed at intervals during the swelling process to the atmosphere. The grain may be spread in a thin layer on travelling endless bands and sprinkled with water or treated with gases. The steeping liquor may be caused to circulate from a reservoir across the steeping grains by a pump, a filter to retain carbon-dioxide being inserted in the circuit and the liquor being enriched with air or oxygen. If air or other gases are introduced into a stationary body of steeping liquor the gas may be passed through a filter to retain volatile substances having valuable odours or taste properties. To prevent diastatic effects during the steeping substances such as dilute solutions of formaldehyde, lime-water, or the like may be added, or the grains may be treated with suitable gases or with light of suitable wave-length, or the steeping may be done in dark rooms.

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